## AMENDMENTS TO THE CLAIMS

**1. (Currently Amended)** A method of producing sub-critical water decomposition products, comprising:

continuously supplying material to be processed into a vertical reactor through an inlet provided for the reactor at a bottom of the reactor, whose interior is kept at a sub-critical condition for water; and

continuously taking out a liquid containing a decomposition product through any selected one of a plurality of outlets provided in a wall of the reactor at ~~different~~ respective positions ~~from~~ which are higher than a position where the inlet of the reactor is provided, wherein selection of one of the outlets adjusts a distance along which the liquid containing the decomposition product flows through the reactor so as to adjust residence time of the liquid containing the decomposition product in the reactor.

**2. (Currently Amended)** A method of producing sub-critical water decomposition products, comprising:

continuously supplying material to be processed into a vertical reactor through an inlet provided ~~for the reactor~~at a bottom of the reactor, whose interior is kept at a sub-critical condition for water;

continuously taking out a liquid containing [[a]] desired decomposition ~~product~~ products through any one of a plurality of outlets provided at ~~a different position from~~ respective positions which are higher than a position where the inlet of the reactor is provided, to form desired steady concentration profiles of the desired decomposition ~~product~~ products in the reactor, the plurality of outlets being provided directly in a sidewall of the reactor; and

taking out the desired decomposition ~~product~~ products through at least one of the outlets, the at least one of the outlets being provided at a position where the concentration of the desired decomposition ~~product~~ products is high, wherein the desired decomposition products taken out of the reactor are not re-supplied into the reactor.

**3. (Previously Presented)** A method of producing sub-critical water decomposition products, comprising:

continuously supplying material to be processed that contains solid matter having a slow

decomposition rate with sub-critical water and a different specific gravity from that of the sub-critical water, into a vertical reactor whose interior is kept at sub-critical conditions for water, through an inlet provided for the reactor;

selecting an outlet from which a liquid containing a decomposition product is let out and adjusting an outlet amount thereof, to make a steady flow in the sub-critical water in a steady state with a plurality of outlets provided at a position different in height from where the inlet is provided for the reactor, the steady flow flowing in an opposite direction to a direction in which the solid matter sinks or floats up and being slower than a sinking velocity or floating velocity of the solid matter;

forming in the steady flow, in the following order from upstream of the flow, at least a fluidized bed in which the solid matter is decomposed into fine particles by the sub-critical water and the fine particles fluidize in the flow, and a sub-critical water dissolution part in which the material to be processed is turned into further finer particles or completely turned into a soluble material to flow with the sub-critical water;

further forming, depending on a type of the material to be processed, a fixed bed in which solid matter stays in a fixed location even with the flow, the fixed bed being formed upstream of the fluidized bed; and

taking out the liquid containing a desired decomposition product from the sub-critical water dissolution part from the reactor, using at least one of the outlets.

**4. (Previously Presented)** A method of producing sub-critical water decomposition products, comprising:

supplying a mixture including an object containing solid matter and subcritical water into a reaction container through a same inlet and causing the mixture to flow in sub-critical water in a steady state in an opposite direction to a direction in which the solid matter flows;

forming in the flow, in the following order from upstream of the flow, at least a fluidized bed in which the solid matter is decomposed into fine particles by the sub-critical water and the fine particles fluidize in the flow, and a sub-critical water dissolution part in which the material to be processed is turned into further finer particles or completely turned into a soluble material to flow with the sub-critical water;

further forming, depending on a type of the material to be processed, a fixed bed in which

solid matter stays in a fixed location even with the flow, the fixed bed being formed upstream of the fluidized bed; and

adjusting a distance through which the sub-critical water dissolution part flows to vary a residence time of the solid matter and a residence time of the sub-critical water from each other and to adjust a degree of decomposition of the components of the material to be processed that have been made soluble to the sub-critical water, whereby a target decomposition treatment product is obtained.

**5. (Previously Presented)** The method according to claim 4, wherein the solid matter sinks in the mixture being in a steady state, and the flow of the mixture is in an opposite direction to that of a gravitational force.

**6. (Previously Presented)** The method according to claim 4, wherein the solid matter floats about in the mixture in a steady state, and the flow of the mixture is in a direction of a gravitational force.

**7. (Previously Presented)** The method according to claim 4, wherein, in the mixture in a steady state, a flow rate of the mixture is less than a sinking velocity or a floating velocity of the mixture.

**8. (Previously Presented)** The method according to claim 4, wherein the mixture is slurry.

**9. (Previously Presented)** The method according to claim 1, wherein a reaction temperature of the sub-critical water decomposition is within a range of from 130°C to 374°C, and a reaction pressure is in a range equal to or higher than a saturated water vapor pressure at the reaction temperature.

**10. (Previously Presented)** The method according to claim 1, wherein the material to be processed is at least one material selected from food, livestock products, agricultural products, marine products, wood, natural organic matter, plastics, chlorinated organic compounds, rubber,

fiber, and wastes thereof, as well as sewage treatment wastes and wastewater treatment wastes.

**11. (Currently Amended)** An apparatus for sub-critical water decomposition treatment, comprising:

a reactor configured to decompose material to be processed using sub-critical water;

heating means for heating a mixture composed of water and the to be processed material to form and keep sub-critical conditions for water;

compressing means for compressing the mixture;

introducing means for introducing the material to be processed into the reactor;

an inlet through which the material to be processed is to be introduced into the reactor, the inlet being provided at a bottom of the reactor; and

a plurality of outlets provided in a wall of the reactor for letting out a mixture of a decomposition product and water from the reactor, wherein the outlets are provided at respective positions which are different from one another in a flow direction of the sub-critical water, and which are ~~different from~~ higher than a position at which the inlet is provided,

wherein the reactor is a vertical reactor in which liquid flows in only one vertical direction.

**12. (Currently Amended)** An apparatus for sub-critical water decomposition treatment, comprising:

a vertical reactor configured to decompose material to be processed with sub-critical water;

heating means for heating a mixture of water and the material to be processed and compressing means for compressing the mixture, so as to form and keep a sub-critical condition for water;

introducing means for introducing the material to be processed into the reactor;

an inlet through which the material to be processed is to be introduced into the reactor, the inlet being provided at a bottom of the reactor; and

an outlet for letting out a mixture of water and a decomposition product from the reactor at a position higher than a position at which the inlet is provided, wherein:

the reactor is arranged substantially vertically; and

~~the inlet is provided for at least one of a top end portion or a bottom end portion of the reactor; and~~

the introduced mixture of the material to be processed and the sub-critical water is caused to flow, in the sub-critical water in a steady state, in an opposite direction to a direction in which the solid matter travels, so as to form in the flow, in the following order from upstream of the flow, at least a fluidized bed in which the solid matter is decomposed into fine particles with the sub-critical water and the fine particles fluidize in the flow, and a sub-critical water dissolution part in which the material to be processed is turned into further finer particles or completely into a soluble material to flow with the sub-critical water, and to further form, depending on the material to be processed, a fixed bed in which solid matter stays in a fixed position even with the flow, the fixed bed being formed upstream of the fluidized bed, and wherein a position of the outlet is adjustable so as to let out the sub-critical water dissolution part and adjust a distance through which the sub-critical water dissolution part flows.

**13. (Original)** The apparatus for sub-critical water decomposition treatment according to claim 12, wherein the outlet is formed at a plurality of positions on a sidewall of the reactor along the flow direction.

**14. (Previously Presented)** The apparatus for sub-critical water decomposition treatment according to claim 12, wherein the outlet is a movable outlet that is continuously movable along the flow direction.

**15. (Previously Presented)** The apparatus for sub-critical water decomposition treatment according to claim 12, wherein the vertical reactor is provided with monitoring means through which the interior is visualized.

**16. (Previously Presented)** The apparatus for sub-critical water decomposition treatment according to claim 12, wherein:

the vertical reactor is a cylindrical vessel;

the inlet is circular; and

an inner diameter of the inlet is within a range of from 1/5 times to 1/15 times an inner

diameter of the vertical cylindrical vessel.

**17. (Previously Presented)** The apparatus for sub-critical water decomposition treatment according to claim 12, wherein the apparatus comprises a plurality of the vertical reactors.

**18. (Previously Presented)** The apparatus for sub-critical water decomposition treatment according to claim 12, wherein:

the apparatus further comprises a tubular reactor for secondary reaction joined to the outlet of the reactor; and

an inner diameter of the tubular reactor for secondary reaction is within a range of 1 to 1/5 times an inner diameter of the vertical cylindrical tubular vessel.

**19. (Previously Presented)** The apparatus for sub-critical water decomposition treatment according to claim 18, wherein:

a plurality of the tubular reactors for secondary reaction are provided; and

the tubular reactors for secondary reaction are connected in series and/or parallel with one another.

**20. (Previously Presented)** The apparatus for sub-critical water decomposition treatment according to claim 18, wherein the apparatus further comprises heating and cooling means for controlling a reaction temperature in the tubular reactor for secondary reaction.

**21. (Previously Presented)** The apparatus for sub-critical water decomposition treatment according to claim 12, wherein:

the vertical reactor is provided with a back-pressure valve; and

a reaction pressure in the vertical reactor is controlled using the back-pressure valve.

**22. (Previously Presented)** The apparatus for sub-critical water decomposition treatment according to claim 21, wherein a cooling pipe is provided immediately before the back-pressure valve.

**23. (Previously Presented)** The method according to claim 2, wherein a reaction temperature of the sub-critical water decomposition is within a range of from 130°C to 374°C, and a reaction pressure is in a range equal to or higher than a saturated water vapor pressure at the reaction temperature.

**24. (Previously Presented)** The method according to claim 3, wherein a reaction temperature of the sub-critical water decomposition is within a range of from 130°C to 374°C, and a reaction pressure is in a range equal to or higher than a saturated water vapor pressure at the reaction temperature.

**25. (Previously Presented)** The method according to claim 4, wherein a reaction temperature of the sub-critical water decomposition is within a range of from 130°C to 374°C, and a reaction pressure is in a range equal to or higher than a saturated water vapor pressure at the reaction temperature.

**26. (Previously Presented)** The method according to claim 2, wherein the material to be processed is at least one material selected from food, livestock products, agricultural products, marine products, wood, natural organic matter, plastics, chlorinated organic compounds, rubber, fiber, and wastes thereof, as well as sewage treatment wastes and wastewater treatment wastes.

**27. (Previously Presented)** The method according to claim 3, wherein the material to be processed is at least one material selected from food, livestock products, agricultural products, marine products, wood, natural organic matter, plastics, chlorinated organic compounds, rubber, fiber, and wastes thereof, as well as sewage treatment wastes and wastewater treatment wastes.

**28. (Previously Presented)** The method according to claim 4, wherein the material to be processed is at least one material selected from food, livestock products, agricultural products, marine products, wood, natural organic matter, plastics, chlorinated organic compounds, rubber, fiber, and wastes thereof, as well as sewage treatment wastes and wastewater treatment wastes.

**29. (Previously Presented)** The method according to claim 1, wherein the vertical reactor is a reactor in which liquid flows in only one vertical direction.

**30. (Previously Presented)** The method according to claim 2, wherein the vertical reactor is a reactor in which liquid flows in only one vertical direction.